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CROFT

June 26, 2000

Dockets Management System
U.S. Department of Transportation
400 Seventh Street, SW
Washington, D.C.
20590-0001

Subject: Docket Number RSPA-99-6283-18 (comments)

Dear Reader:

Enclosed are a summary of my comments which are, in a few words -

We feel it would be of great help to the shippers using 49CFR if the terminology used in ST-1 concerning "..transport severity levels..." were to be incorporated into 49CFR in this revision. As shown in the Attachment, there are many uses of the words - normal conditions of transport, conditions of transport, under normal conditions of transport, etc.

This same letter in a slightly different format has been submitted to the RSPA for comments or our interpretation of the use of these terms in 49CFR.

Thank You,

Don Edling

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DISCUSSION SHEET

TOPIC: WHAT IS MEANT BY THE TERMS, "...NORMAL CONDITIONS OF TRANSPORT," "...UNDER CONDITIONS NORMALLY INCIDENT TO TRANSPORTATION," "...NORMAL TRANSPORT,", ETC?

Don Edling
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1-22-99

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There are at least nine (9) variations of the words, **"normal conditions of transport, conditions normally incident to transport, etc."** which appear in 49 CFR in various places. There is also at least one reference in 10 CFR 71 to "**normal conditions of transport**." These variations are given in Attachment A in more detail. There may be more which are not referenced, but the problem becomes apparent with just these nine variations.

We believe the intent of the DOT is to represent three categories of insults that a package might be exposed to during transport.

Category No. 1 - The first category of insults a package might be exposed to is a generalized set of conditions, which have no actual tests prescribed, and are intended to be the "humps and the bumps" seen in normal road and rail transport, the temperature variations a package might see in transport, possible pressure variations a package might see, etc. With respect to the terminology used in 49 CFR, we feel this second category is best described by the term, "**conditions normally incident to transportation**" as used for example in 173.24, 173.24a and 173.24b.

This category would seem to apply best to "Strong, Tight" and "IP-1 packagings." Obviously each of the above packagings have to meet *173.410 General Packaging requirements*, but as discussed below, we feel the reference to *"...normal conditions of transport..."* in 173.410(f) is intended to mean Category No. 1.

Category No. 2 - The second category represents more severe insults which might be encountered as a result of transportation incidents or mis-handling - Water Spray, 4-ft. Drop, Penetration and Stacking. There are specific tests prescribed to determine the performance of radioactive materials packagings when exposed to these potential conditions. These tests are referred to as the DOT Spec 7A Type A tests, as given in 49 CFR173.465 & 466. Paragraph 173.465 is entitled ***"Type A packaging tests."*** One significant reference is 49 CFR 173.403 Package (2) where it refers to the Type A packaging tests as **"normal conditions of transport."**

Type A packagings would fall into this category, requiring *"Type A packaging tests,"* per 173.465. IP-2 & IP-3 packagings also require designated testing per 173.465 as stated in 173.411 *Industrial packagings.*

10 CFR 71.71 also makes reference to the Type A tests as **"normal conditions of transport."**

Category No. 3 - The third category represents severe hypothetical accident conditions (Type B packagings). This category will not be discussed any further.

Our application of the these terms is consistent with usage in **SAFETY STANDARD SERIES No. ST1, IAEA ST-1 1996, REGULATIONS for the SAFE TRANSPORT of RADIOACTIVE MATERIALS**, 1996 Edition (fourth Draft dated January 20, 1996).

In the above referenced document, the terminology given below, is used:

"Transport severity levels, in applying a graded approach to the performance standards in these regulations, shall be characterized by the general severity levels:

(a) routine conditions of transport (incident free);
(b) normal conditions of transport (minor mishaps);
(c) accident conditions of transport."

In line with our previous terminology (i.e. Category 1 & Category 2):

- "(a) routine conditions of transport (incident free) would correspond to **"...under conditions normally incident to transportation"** or our terminology of Category No. 1.

- "(b) normal conditions of transport (minor mishaps) would correspond to **"...normal conditions of transport,"** which are the Type A tests or our terminology of Category No. 2.

If one agrees with this terminology and application, then the performance requirements for **"...normal conditions of transport"** are well defined (i.e. Category No. 2).

This leaves only the **"...under conditions normally incident to transportation"** (Category No. 1) for which one has to determine the package performance required. If there are no prescribed tests, then who decides to what level a packaging must perform in order to **achieve regulatory compliance**?" And, a related question is **"How does one go about making this determination?"**

We propose that this is one of the many duties which fall under the "shipper responsibility" category. The "shipper" knows the method of transport, and about what to expect from, say, truck or rail transport with respect to vibration, bumping, package interactions, stops and accelerations. The shipper also would be able to judge the approximate temperature extremes - (i.e. if the route goes thru northern Idaho in January, the package could get very cold, or if the route goes through Death Valley in July, the package could get very hot). Another example concerns pressure increase/decrease due to elevation changes (and or temperature variations which may coincide). There is only one instance in ***173.410 General design requirements*** and this *is* ***Paragraph (f)*** where words such as "acceleration," "vibration," etc. appear and this paragraph then makes reference to paragraphs 173.24, 173.24a & 173.24b. Note the vibration test is referenced in 173.24a(a)(5). Thus, it is reasonable to assume that the vibration/acceleration referenced in paragraph (f) is comparable to that represented by the vibration test given in 173.24a(a)(5).

The table given below provides a brief summary of the above discussion:

For clarification: Category 1 is deemed to be equivalent to "routine conditions of transport" as given in ST-1
Category 2 is deemed to be equivalent to "normal conditions of transport" as given in ST-1

TABLE 1

49 CFR REFERENCE	CROFT INTERPRETATION	DISCUSSION
173.24(b) "...under conditions normally incident to transportation" (UCNITT)	Category 1 - the generalized set of conditions, not the Type A tests	This seems fairly straight-forward since this reference is in the "***General requirements for packagings...***"
173.24(f) Closures (1) "UCNITT	Category 1 - the generalized set of conditions, not the Type A tests	Same thoughts as above. (Note the mention of temperature and vibration effects)
173.24(g) Venting (2) "..under normal conditions of transportation."	Category 1 - the generalized set of conditions, not the Type A tests	It seems this would be intended for all haz mat packages, not just those which require Type A testing.
173.24a(a)(3) UCNITT	Category 1 - the generalized set of conditions, not the Type A tests	This paragraph mentions securing inner packagings to prevent breakage or leakage and to control movement UCNITT. This implies Category 1 since for the Type A tests, the criteria is no loss of contents from the package.
173.403 Definitions - Package (2) "...under normal conditions of transport." (UNCOT)	Category 2 - the Type A tests - ***173.465 Type A packaging tests***	This is again straight forward since the reference UNCOT specifically goes to ***173.465 Type A packaging*** **tests**
173.410 General design requirements (f) UNCOT	Category 1 - The generalized set of conditions, not the Type A tests.	The intent seems to be that all packagings have closure systems that will not loosen or lose effectiveness after exposure to acceleration , vibration, etc. And, this paragraph refers to the vibration test in 173.24a.
173.411 Industrial packagings "..normal handling and normal conditions of transport."	Category 1 - The generalized set of conditions, not the Type A tests.	Since this paragraph involves portable tanks, it is pretty obvious that the intent is not to require compliance after a four-foot drop test, etc.
173.412 Additional design requirements for Type A packages (d) "... normal transport."	Category 2 - The Type A tests - ***173.465 Type A packages***	Since this requirements is specified for Type A packages, it does not really matter what "***...normal transport..***" means. The

		package must meet the Type A performance criteria and the requirements of 173.410, 173.24, 173.24a & 173.24b..
(i) "...under normal conditions.."	Category 2 - The Type A tests - *173.465 Type A packages*	Since this requirement is specified for Type A packages, it does not matter what *"...normal conditions.."* means. The intent seems to be to assure that any failure of any tie-down device ....won't impair the ability of the package to meet the other requirements.
173.427 (LSA) (a)(6)(iii) UCNITT	Category 1 - The generalized set of conditions, not the Type A tests.	The intent here seems to be directed at the shipment as a whole. Individual packages must not shift under Category 1 conditions, but it is apparent that should the whole shipment be subjected to a four-foot drop, there would be some shifting expected.
(b)(3) "..under normal conditions of transport."	Category 1 - The generalized set of conditions, not the Type A tests.	This paragraph requires exclusive use, $< A_2$ per package, etc. and as such authorizes the use of strong, tight packages. It does not require Type A packages, so the intent must be for the generalized set of conditions (Category 1).
173.448 General transportation requirements (a) "... normal transportation conditions.."	Category 1 - The generalized set of conditions, not the Type A tests.	In this instance the word "Shipment" is used - *"each shipment.."* and as such the intent of the words *"...normal transportation conditions.."* surely means Category 1 conditions.
173.465 Type A packaging tests (c) Free drop test Table 12 ".....Normal Conditions of Transport"	Category 2 - The Type A tests- **173.465. Type A packages**	As given in the paragraph **173.465**

CONCLUSION:

CROFT feels there is a definite need for consistent use of terms and terminology throughout the regulations. The "***Transport severity levels...***" given in ST-1 seem to be a definite step in this direction.

We ask that terminology consistent with ST-1 be incorporated into 49CFR. We feel this will help the shippers and also provide a more reliable base for compliance management.

ATTACHMENT A

Examples of terminology usage

1. 173.24 General requirements for packagings and packages
   (b) Each package used for shipment of hazardous materials under this subchapter shall be designed, constructed, maintained, filled, its contents so limited, and closed so that **under conditions normally incident to transportation-**
      (1) Except as otherwise provided in this subchapter, there will be no identifiable (without the use of instruments) release of hazardous materials to the environment.
      (2) The effectiveness of the package will not be substantially reduced; for example, impact resistance, strength, packaging compatibility, etc. must be maintained for the minimum and maximum temperatures encountered during transportation;
      (3) There will be no mixture of gases or vapors in the package which could, through any credible spontaneous increase of heat or pressure, significantly reduce the effectiveness of the package.

2. 173.24(f) Closures
   (1) Closures on packages shall be so designed and closed that **under conditions** (including the effects of temperature and vibration) **normally incident to transportation**

3. 173..24(g) Venting ....is permitted only when -
   (2) Except as otherwise provided in this subpart, the evolved gases are not poisonous, likely to create a flammable mixture with air or be an asphyxiant **under normal conditions of transportation.**

4. 173.24a Additional general requirements for non-bulk packagings and packages
   (a) Packaging design. Except as provided in 173.312 of this subchapter:
      (3) Securing and cushioning. Inner packagings of combination packagings ..... to control their movement within the outer packaging **under conditions normally incident to transportation**.

5. 173.403 Definitions
   Package means.....
      (2) "Type A package" means a packaging that, together with its radioactive contents limited to A_1 or A_2 as appropriate, meets the requirements of 173.410 and 173.412 and is designed to retain the integrity of containment and shielding required by this part **under normal conditions of transport** as demonstrated by the tests set forth in 173.465 or 173.466, as appropriate.

      (3) "Type B package" means..... when subjected to the **normal conditions of transport** .....

6. 173.410 General design requirements.
   (f) The package will be capable of withstanding the effects of any acceleration, vibration or vibration resonance that may arise **under normal conditions of transport .....**

7. 173.411 Industrial packagings
   (b) (4) Each specification IM101..... must:
      (iii) Be designed so that any added shielding is capable of withstanding the static and dynamic stresses resulting from **normal handling and normal conditions of transport;**

8. 173.412 Additional design requirements for Type A packages

(d) The packaging must include a containment system securely closed by a positive fastening device that cannot be opened ..... during **normal transport.**

(i) Failure of any tie-down attachment that is a structural part of the packaging, **under both normal and accident conditions,**.....

9. 173.427 Transport requirements for low specific activity (LSA) Class 7 (radioactive) materials and surface contaminated objects (SCO)

(a)(6)(iii) Packages must be braced so as to prevent sifting of lading **under conditions normally incident to transportation.**

(b)(3) For domestic transportation only, in strong, tight package that prevents leakage of the radioactive content **under normal conditions of transport**.

10. 173.448 General transportation requirements

(a) Each shipment of Class 7 (radioactive) materials must be secured to prevent shifting during **normal transportation conditions.**

11. 173.465 Type A packaging tests

(c) Free drop test

Table 12. - Free Drop Distance for Testing Packages to **Normal Conditions of Transport**

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10 CFR 71.71 (NRC Regulations) Normal Conditions of Transport

(c)(7) Free drop, etc.